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Erstellen eines Lernprogrammes für Medizinstudenten und Assistenzärzte

Medienarbeit

MASTERARBEIT

zur Erlangung des akademischen Grades
Master of Medicine (M Med) der Medizinischen Fakultät der Universität Zürich

vorgelegt von
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Inhaltsverzeichnis

1. Zusammenfassung 3

2. Einleitung 4

3. Material und Methoden 5

3.1. Vorgehen 5

3.2. Medium 5

3.3. Patienten 5

3.4. Zielpublikum 5

3.5. Ethik 6

4. Medienarbeit 7

5. Resultate 57

5.1. Test 57

5.2. Ergebnis 59

5.3. Feedback 59

5.3.1. Sinn 59

5.3.2. Benutzung 60

5.3.3. Schwierigkeit 60

5.3.4. Erschwert durch Fremdsprache 61

5.3.5. Verbesserungsvorschläge und Kommentare 61

6. Diskussion 63

7. Literaturverzeichnis 64

8. Lebenslauf 65

9. Erklärung 66

1. Zusammenfassung

Das Ziel dieser Masterarbeit war es, mit Bildern der medizinischen Poliklinik des Universitätsspitals Zürich die Grundlage für ein Lernprogramm für Medizinstudenten und Assistenzärzte zu erstellen, das einige der wichtigsten Blickdiagnosen abdeckt. Um die Bilder sollte ein Fall konstruiert und dazu Fragen und Lösungstexte verfasst werden. Die Medienarbeit sollte dann an Medizinstudenten getestet und mit einem Feedback bewertet werden.

Die Vorlage für das Lernprogramm wurde mit PowerPoint erstellt und dann wurde mittels eines Online Tools ein Test erstellt, bei welchem sich ausgewählte Studenten einloggen, die Fragen beantworten und Feedback abgeben konnten. Die Medienarbeit wurde in Englisch verfasst.

17 Medizinstudenten absolvierten den Text und beantworteten durchschnittlich 59.34% der Fragen korrekt (Diagramm 1). Mehr als die Hälfte (9 von 17) bewerteten das Lernprogramm als sehr sinnvoll (Diagramm 2) und ebenfalls mehr als die Hälfte (9 von 17) würden ein Lernprogramm in diesem Stil definitiv benutzen (Diagramm 3). Die Schwierigkeit wurde eher als hoch eingestuft (Diagramm 4) und ein erschwertes Beantworten der Fragen durch die Fremdsprache wurde durchmischt bewertet (Diagramm 5). Im offenen Feedback wurde mehrmals die Bildqualität bemängelt und die Länge der Lösungstexte angesprochen.

Generell wurde das Lernprogramm sehr positiv aufgenommen, da eine Mehrheit es als sehr sinnvoll bewertet hat und es definitiv benutzen würde. Um ein differenzierteres Feedback zu bekommen, müsste das Lernprogramm noch an mehr Teilnehmern getestet werden. Bei der Entwicklung der App sollte auf eine hohe Bildqualität geachtet werden und gegebenenfalls eine Übersetzung einzelner Begriffe angeboten werden.

2. Einleitung

Die medizinische Poliklinik des Universitätsspitals Zürich verfügt über eine Bilder-Datenbank von über 10'000 internistischen Bildern. Diese Bilder wurden seit den 1950er Jahren gesammelt und decken einen grossen Teil der Blickdiagnosen der Inneren Medizin ab. Die Idee dieser Masterarbeit war es, einen Teil dieser Bilder sinnvoll zu verwenden und damit die Grundlage für ein Lernprogramm für Medizinstudenten und Assistenzärzte zu erstellen. Um ein Bild sollte jeweils ein Fall konstruiert werden, mittels Fragen das Wissen der Studenten und Ärzte getestet und mit Lösungstexten Wissen aufgefrischt werden. Die Medienarbeit sollte die Grundlage liefern, um zu einem späteren Zeitpunkt eine App zu erstellen.

Das Lernprogramm soll als spielerische Ergänzung zu bereits bestehenden Lernsystemen dienen. Es bietet viel Repetitionsstoff, welcher über eine Vielzahl von Fachgebieten hinweg reicht. Das Lernprogramm soll jedoch nicht als gänzlicher Ersatz bestehender Systeme dienen. Es zeigt dem Benutzer Lücken in seinem Wissen auf, die er danach mit anderen Lehrmitteln vertiefen kann. Dadurch, dass es durch eine Person erstellt wurde, die sich mitten im Lernprozess befindet, ist es optimal auf die Bedürfnisse der Studenten zugeschnitten. In Form einer App wird das Lernprogramm einfach zugänglich und gut zu verbreiten sein. Ebenfalls wird es somit auf heute üblichen Lernmedien wie Smartphone und Tablets verwendet werden können. Ausserdem ist das Lernprogramm durch Verwendung weiterer Bilder und Konstruieren entsprechender Fälle jederzeit erweiterbar.

Nach der Fertigstellung sollte das Lernprogramm durch 10 bis 20 Medizinstudenten getestet und ein strukturiertes Feedback erfasst werden, welches die Qualität und den Nutzen der Medienarbeit erfragen sollte.

3. Material und Methoden

3.1. Vorgehen

Als erster Schritt wurden 50 passende Bilder aus der Bilder-Datenbank des Universitätsspitals Zürich ausgewählt. Danach wurde zu jedem Bild und der entsprechenden Blickdiagnose ein kurzer Patientenfall konstruiert. Zu jedem Bild wurden anschliessend ein bis drei Fragen mit jeweils vier Auswahlantworten gestellt, von denen eine korrekt war. Zu jeder Antwort wurde ein kurzer Lösungstext verfasst.

Anschliessend wurde mithilfe des Online Testing ClassMarker ein Test generiert, bei welchem sich die angefragten Medizinstudenten einloggen, den Test absolvieren und ein Feedback abgeben konnten.

Als letzter Schritt wurden die Ergebnisse analysiert und das Feedback ausgewertet.

3.2. Medium

Die Medienarbeit liefert die Grundlage für die Erstellung eines Lernprogramms, das in Form einer App programmiert werden soll. Diese befindet sich zum Zeitpunkt der Fertigstellung der Masterarbeit in Vorbereitung.

Die App als Medium wurde gewählt, weil damit auf eine unkomplizierte Art viele Benutzer erreicht werden können und gleichzeitig der Zugang beschränkt werden kann. Damit die App für möglichst viele Benutzer verfügbar sein soll, wurde die Medienarbeit in Englisch verfasst.

3.3. Patienten

Die verwendeten Bilder stammen aus der seit 1950 bestehenden Bilder-Datenbank der medizinischen Poliklinik des Universitätsspitals Zürich. Die Patienten auf den Bildern wurden aufgrund ihrer Blickdiagnose und der Qualität der Bilder ausgewählt.

3.4. Zielpublikum

Das Zielpublikum der Medienarbeit sind Medizinstudenten und Assistenzärzte der Universität und des Universitätsspitals Zürich.

3.5. Ethik

Bei den Patienten wurde kein Informed Consent eingeholt. Es wurde jedoch darauf geachtet, dass die Bilder ausreichend anonymisiert wurden. Zudem wird das Lernprogramm nur Medizinstudenten und Assistenzärzten der Universität und des Universitätsspitals Zürich zugänglich gemacht.

4. Medienarbeit

Die Vorlage für das Lernprogramm wurde in einem PowerPoint-Format verfasst. Pro Bild wurde ein Fall konstruiert und ein bis drei Fragen mit jeweils vier Auswahlantworten und entsprechenden Lösungstexten formuliert.

Im Folgenden werden die 50 Fälle präsentiert.

Case 1 (Morbus Wilson)

A girl of 14 presents herself with continuing fatigue and loss of performance. She also noticed a slight tremor of the right hand. The laboratory test shows increased bilirubin and liver enzymes.

Question 1.1
The picture shows the patient‘s eyes. What do you see?

Answers 1.1
A) Scleral jaundice
B) Keratoconjunctivitis
C) A Kayser-Fleischer ring
D) Abnormally small pupils

Solution 1.1
A) incorrect
B) incorrect
C) correct: The golden-brownish Kayser-Fleischer ring is formed because copper is deposited I nto the Descemet's membrane of the cornea.
D) incorrect

Question 1.2
What is your diagnosis?

Answers 1.2

A) Copper excess

B) Morbus Wilson

C) Hemochromatosis

D) Cirrhosis of the liver

Solution 1.2

A) incorrect

B) correct: Morbus Wilson is a genetic disorder of the copper homeostasis due to a mutation in the ATP7B gene. It occurs in about 30 individuals per million population. The gene defect results in a decreased copper elimination because of the defect P-type ATPase. The ATPase is mainly expressed in hepatocytes and functions as a copper transporter. If its function is reduced, less copper is excreted into bile. As a result, copper accumulates and injures the liver. Eventually, copper is released into the circulation and is deposited in the brain, kidney and cornea. That can lead to neurological symptoms, kidney function disorder and the typical Kayser-Fleischer ring.

C) incorrect

D) incorrect

Question 1.3
Which additional laboratory test results would you expect?

Answers 1.3

A) Total serum copper increased

B) Urinary copper excretion decreased

C) Serum ceruloplasmin decreased

D) Hepatic copper level decreased

Solution 1.3

A) incorrect

B) incorrect

C) correct: Ceruloplasmin is mainly produced in the hepatocytes and is the major carrier for copper in the blood, it normally binds 95 % of the serum copper. Because of the defect ATPase ceruloplasmin is decreased, leading to increased free copper.

D) incorrect

Case 2 (Infective Endocarditis)

A patient of 41 years presents himself with fever up to 39 °C and shivering. He reports of weakness and appetite loss. He doesn't complain about any pain.

Question 2.1
The skin manifestation you can see in the picture is typical for the patient's illness. What is your diagnosis?

Answers 2.1
A) Infective endocarditis
B) Meningitis
C) Diabetes mellitus
D) Wegener granulomatosis

Solution 2.1
A) correct: These painful hemorrhagic indurations on fingers as well as toes are called Osler's nodes. They are caused by small cardiac emboli or an immune complex vasculitis due to infective endocarditis. Infective endocarditis occurs in about 3 out of 100'000 per year and can end deadly if untreated.
B) incorrect
C) incorrect
D) incorrect

Question 2.2
What are the most common organisms to cause endocarditis in a patient with native valves?

Answers 2.2
A) Coagulase-negative staphylococci and viridans streptococci
B) Staphylococcus aureus, viridans streptococci and HACEK
C) Staphylococcus aureus and coagulase-negative staphylococci
D) Enterococcus and HACEK

Solution 2.2
A) incorrect
B) correct: Over 90 % of infective endocarditis in patients with native valves are caused by viridans streptococci and Staphylococcus aureus. Also common is the HACEK group as well as enterococci. In patients with prosthetic valves over 80 % of the cases are caused by coagulase-negative staphylococci and Staphylococcus aureus.
C) incorrect
D) incorrect

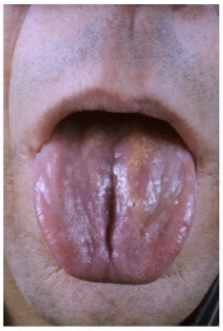
Question 2.3
What is the empirical antibiotic treatment for a patient with native valves?

Answers 2.3
A) Vancomycin + Rifampicin
B) Vancomycin + Gentamicin + Rifampicin
C) Vancomycin + Gentamicin
D) Penicillin G + Gentamicin + Flucloxacillin

Solution 2.3
A) incorrect: Indicated only when the Staphylococcus aureus proves Methicillin-resistant in the culture.
B) incorrect: Empirical treatment for patients with prosthetic valves.
C) incorrect: Empirical treatment for patients with native valves and Penicillin allergy.
D) correct

Case 3 (Iron Deficiency Anemia)

An 18 year old adolescent complains about feeling weak and tired despite sleeping more than enough. He says this is keeping him from achieving his usual training goals.



Question 3.1
The picture shows the patient's tongue. What is the most probable diagnosis?

Answers 3.1

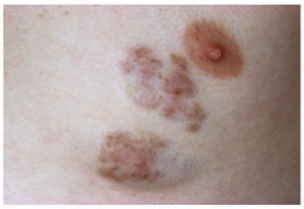
A) Zinc deficiency
B) Megaloblastic anemia
C) Hemolytic anemia
D) Iron deficiency anemia

Solution 3.1

A) incorrect
B) incorrect
C) incorrect
D) correct: You see an atrophy of the tongue mucosa which is a sign for chronic iron deficiency. Iron deficiency is one of the most prevalent forms of malnutrition. It is also the most common cause of anemia. Iron deficiency can result when there is decreased iron intake or absorption (e.g. malnutrition, sprue), increased iron demand (e.g. rapid growth, pregnancy, intensive training) or increased iron loss (e.g. menses, chronic blood loss).

Case 4 (von Recklinghausen's Disease)

A 50 year old man comes by for a routine examination. During the examination you notice cutaneous changes. When you ask the patient about them, he tells you that he has had them as long as he can remember and gotten used to them.



Question 4.1
The picture shows the patient's front. What do you see?

Answers 4.1
A) Small hematomas
B) Café au lait spots
C) Multiple nevi
D) Melanoma

Solution 4.1
A) incorrect
B) correct
C) incorrect
D) incorrect

Question 4.2
The picture shows the patient's neck. Which diagnosis is most likely?

Answers 4.2
A) Tuberous sclerosis
B) Allergic reaction
C) Neurofibromatosis Type 2
D) Neurofibromatosis Type 1

Solution 4.2
A) incorrect
B) incorrect
C) incorrect
D) correct: Neurofibromatosis Type 1 is also called von Recklinghausen's Disease. It is one of the most common autosomal dominant disorders with a birth incidence of 1 in 2500 to 1 in 3000. Half of the cases are familial, the order half arise from new mutations. The affected NF1 gene encodes a GTPase-activating protein called neurofibromin. Mutations result in different tumors of the nervous system, such as neurofibromas, optic nerve gliomas, astrocytomas and meningiomas. Also associated are pheochromocytomas, scoliosis, pseudoarthrosis and hamartomas of the iris called Lisch nodules. Café au lait spots and axillary freckling are additional cutaneous manifestations.

Case 5 (Lead Poisoning)

When you examine a 50 year old patient, you also take a look at his mouth.

Question 5.1
The picture shows the patient's teeth. What caused the discoloration?

Answers 5.1
A) Lead poisoning
B) Bacteria
C) Antibiotics
D) Amalgam

Solution 5.1
A) correct
B) incorrect
C) incorrect
D) incorrect

Case 6 (Cushing's Syndrome)

A 50 year old man comes to see you because he has gained a lot of weight in a short time although he hasn't changed his eating habits. He also complains about quickly tiring muscles.

Question 6.1
The picture shows the patient from the side. What is your diagnosis?

Answers 6.1
A) Adiposity and bruises
B) Cushing's syndrome
C) Adrenal insufficiency
D) Hypothyroidism

Solution 6.1
A) incorrect
B) correct: Central obesity, a rounded face and broad purple stretch marks are typical clinical signs for hypercortisolism, called Cushing's syndrome. Other symptoms are myopathy and weakness or osteoporosis with possible bone pain.
C) incorrect
D) incorrect

Question 6.2
What is not a possible cause of Cushing's syndrome?

Answers 6.2

A) Small cell lung cancer

B) Prolactinoma

C) Long term treatment with glucocorticoids

D) Pituitary adenoma

Solution 6.2

A) incorrect

B) correct: Cushing's syndrome is caused by a chronic exposure to excess glucocorticoids. The exposure can originate from an exogenic or endogenic cause. Exogenically it is induced through long term treatment with glucocorticoids against various inflammatory diseases or for immunosuppression. Endogenically it can be ACTH-dependent (e.g. pituitary adenoma, ectopic secretion of ACTH in nonpituitary tumors, such as small cell lung cancer or carcinoid tumors) or ACTH-independent (e.g. adrenocortical adenoma or carcinoma). Overall, long term treatment with glucocorticoids is the most frequent cause for Cushing's syndrome.

C) incorrect

D) incorrect

Question 6.3
Which parameter result would you expect in a laboratory test?

Answers 6.3

A) Hypercholesteremia

B) Eosinophilia

C) Decreased white blood cells

D) Hypoglycemia

Solution 6.3

A) correct: Glucocorticoids have a wide range of effects. They stimulate the gluconeogenesis which results in catabolism with muscle atrophy and osteoporosis. They serve as an antagonist to insulin: a diabetic metabolic status is supported (elevated glucose levels). Through their effect on the lipometabolism a hyperlipidemia can result (elevated cholesterol levels). They also lead to increased numbers of white and red blood cells, eosinopenia and lymphopenia and increased numbers of blood platelets.

B) incorrect

C) incorrect

D) incorrect

Case 7 (Addison's Disease)

A 48 year old woman presents herself with fatigue and loss of energy. She tells you that she has been losing weight despite not eating less.

Question 7.1
The picture shows the patient's hands. What is the most likely cause of your patient's disease?

Answers 7.1
A) Tuberculosis
B) Autoimmune process
C) Metastasizing carcinoma
D) Hemorrhage

Solution 7.1
A) incorrect
B) correct: Your patient suffers from primary adrenal insufficiency. You can tell by the hyperpigmentation of her skin, caused by increased ACTH secretion. Also, the woman's symptoms are very typical for cortisol deficiency. Primary adrenal insufficiency can be caused by all of the above, but in 80 % of the cases it is caused by autoimmune adrenalitis which can be isolated or part of an autoimmune polyglandular syndrome. Rarely, the insufficiency can also be caused by congenital diseases such as adrenal hypoplasia. An operative removal of the adrenal glands always has to be considered.
C) incorrect
D) incorrect

Question 7.2
Which additional sign or symptom wouldn't you expect?

Answers 7.2
A) Hypernatremia
B) Hypotension
C) Hypoglycemia
D) Abdominal pain

Solution 7.2
A) correct: Because of the deficiency of aldosterone (which normally leads to sodium retention and potassium elimination), you would expect a hyponatremia and a hyperkalemia. Also, hypotension would result. As a consequence of the deficiency of cortisol, a hypoglycemia would occur.
B) incorrect
C) incorrect
D) incorrect

Case 8 (Lyme Borreliosis)

A 30 year old man comes by to show you what he calls a red rash on his arm. It doesn't itch him. He denies feeling ill, on the contrary, he has been doing a lot of running in the woods as he is training for a marathon.

Question 8.1
The picture shows the patient's upper arm. What do you see?

Answers 8.1

A) A wheal

B) An erythrodermia

C) An erythema nodosum

D) An erythema migrans

Solution 8.1

A) incorrect

B) incorrect

C) incorrect

D) correct: The erythema migrans is caused by a tick bite. After an incubation period of 1 to 6 weeks the lesion expands from a red macula to a bigger annular lesion. As it expands, it sometimes forms a red outer border and partial central clearing. It can look like a target.

Question 8.2
Which organism causes the erythema migrans?

Answers 8.2

A) The tick

B) Borrelia burgdorferi

C) Anaplasma phagocytophilum

D) Streptococcus

Solution 8.2

A) incorrect

B) correct: Erythema migrans is the first stage of Lyme borreliosis which is caused by a tick infected with Borrelia burgdorferi. The rate of infected ticks varies between 5 and 35 %. In Europe and Asia, the second stage is characterized by radicular pain, meningeal or encephalitic signs are frequently absent (symptoms of meningitis are typical in the United States). Usually, the patients experience musculoskeletal pain during this stage and may develop cardiac involvement. After several months, untreated patients in the United States develop chronic arthritis. Especially the knees are affected. In Europe and Asia, acrodermatitis chronica atrophicans, a late skin manifestation, develops. The lesions are usually found on the arms or legs, start with a reddish-violaceous discoloration and become sclerotic. Also possible is chronic neurologic involvement such as polyneuropathy or encephalopathy.

C) incorrect

D) incorrect

Case 9 (Scarlet Fever)

A 10 year old girl is brought to you by her mother. She has high fever and throat pain. Also, she has an exanthema on her upper body and face.

Question 9.1
The picture shows the girl's tongue. What is you diagnosis?

Answers 9.1
A) Rubella
B) Measles
C) Scarlet fever
D) Allergic reaction

Solution 9.1
A) incorrect
B) incorrect
C) correct: The "strawberry tongue" is characteristic for scarlet fever. Scarlet fever is caused by Streptococcus pyogenes or specifically, by its toxin. Mostly children between the age of 3 to 10 are infected.
D) incorrect

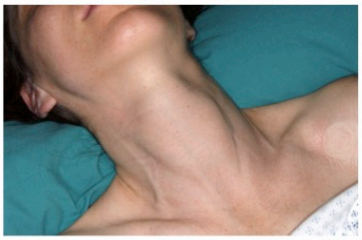
Question 9.2
With scarlet fever, which sign or symptom would you check for?

Answers 9.2
A) Angina tonsillaris with enanthema
B) Koplik's spots
C) Nuchal lymph node swelling
D) Splenomegaly

Solution 9.2
A) correct
B) incorrect: You find Koplik's spots with measles.
C) incorrect: You find nuchal lymph node swelling with rubella.
D) incorrect: You can find splenomegaly with rubella or infectious mononucleosis.

Case 10 (Goiter)

A 40 year old woman presents herself with weight loss despite increased appetite. She feels tired all the time and has experienced some muscle weakness while climbing stairs.



Question 10.1
The picture shows the patient's neck. What is the most common cause of your diagnosis?

Answers 10.1
A) Graves' disease
B) Subacute thyroiditis
C) Pituitary adenoma
D) Toxic adenoma

Solution 10.1
A) correct: You see a goiter, which is an enlarged thyroid gland. In combination with the patient's symptoms, you would suspect hyperthyroidism, which is most commonly caused by the autoimmune Graves' disease. It occurs in up to 2 % of the female population, but only in 0.2 % of men. It typically occurs between 20 and 50 years. Graves' disease is caused by an auto-antibody which mimics TSH to the TSH receptor, leading to increased secretion of thyroid hormones.
B) incorrect
C) incorrect
D) incorrect

Question 10.2
What is not an additional sign or symptom of Graves' disease?

Answers 10.2
A) Lid retraction
B) Pretibial myxedema
C) Acropachy
D) Hair loss

Solution 10.2
A) incorrect
B) incorrect
C) incorrect
D) correct: You typically see hair loss in a patient with hypothyroidism.

Case 11 (Anasarca)

The nurse of a 70 year old patient calls you because she is concerned about something she noticed. The man is in the hospital because of a hip operation.

Question 11.1
After the nurse shifted the patient in bed, she noticed the dents shown in the picture. What is your diagnosis?

Answers 11.1

A) Anasarca

B) Decubitus

C) Ascites

D) Myxedema

Solution 11.1

A) correct: Anasarca is a generalized edema caused by fluid effusion from the vascular to the extravascular space. Certain diseases can lead to hypervolemia in the vessels, causing the hydrostatic pressure to rise, which is then no longer in balance with the oncotic pressure. An increased filtration pressure results which then causes the fluid effusion. In patients confined to bed the edema may be most prominent in the presacral region.

B) incorrect

C) incorrect

D) incorrect

Question 11.2
What is not a possible cause for anasarca?

Answers 11.2

A) Right ventricular failure

B) Left ventricular failure

C) Kidney failure

D) Liver cirrhosis

Solution 11.2

A) incorrect

B) correct: Backward failure of the left ventricle generally leads to respiratory symptoms because of the pulmonary congestion. Symptoms are shortness of breath, increasing breathlessness while lying flat (=orthopnea) and also pulmonary edema. Forward failure may show itself with a general feeling of weakness or also dizziness. On the contrary, failure of the right ventricle leads to congestion of the systemic capillaries which results in peripheral edema or anasarca. Also, the jugular venous pressure is often visibly increased.

C) incorrect

D) incorrect

Case 12 (Alcoholic Liver Disease)

A 60 year old man visits your practice for the regular control of his blood pressure. He says he feels fine. While you check his blood pressure, you notice something on the palm of his hand and ask him if you could take his blood for a check.

Question 12.1
The picture shows the palm of the patient's hand next to the palm of an examiner's hand. What is your most likely diagnosis?

Answers 12.1

A) Alcoholic liver disease

B) Dermatomyositis

C) Hyperthyreosis

D) Chronic obstructive pulmonary disease

Solution 12.1

A) correct: The man has a palmar erythema, which is typically found in patients with alcoholic liver disease. Other possible signs are Spider naevi, jaundice and abdominal baldness or gynecomasty in men as a result of hormonal dysfunction. Symptoms include fatigue and loss of energy or a feeling of pressure in the upper abdomen. Portal hypertension can result and as a complication of that variceal bleeding, ascites or edema.

B) incorrect

C) incorrect

D) incorrect

Question 12.2
Which laboratory test result wouldn't you expect?

Answers 12.2

A) Hyperalbuminemia

B) Hyperbilirubinemia

C) AST elevated

D) ALT elevated

Solution 12.2

A) correct: In patients with alcoholic liver disease albumin would be decreased as a sign of the decreased synthesis activity of the liver. Bilirubin is increased because of the decreased metabolism activity. AST and ALT are elevated as a sign of the liver injury.

B) incorrect

C) incorrect

D) incorrect

Case 13 (Hyperlipidemia)

A 45 year old man shows you lesions on his eyelids which he noticed lately. He negates pain or itching.

Question 13.1
The picture shows the patient's eyelids. What is your diagnosis?

Answers 13.1
A) Seborrhoeic eczema
B) Neurofibromatosis
C) Hyperlipidemia
D) Multiple chalazions

Solution 13.1
A) incorrect
B) incorrect
C) correct: These yellow lesions on the eyelids are called xanthelasma. They appear in patients with lipid disorders such as familial hypercholesterolemia (FH) or familial defective Apo-B 100 (FDB).
D) incorrect

Question 13.2
Which parameter(s) is/are elevated in the mentioned lipid disorders?

Answers 13.2
A) Triglycerides
B) LDL-cholesterol
C) HDL-cholesterol
D) LDL-cholesterol and triglycerides

Solution 13.2
A) incorrect
B) correct: Only LDL-cholesterol is elevated, triglyceride levels are normal. FH is caused by a large number of mutations in the LDL receptor gene leading to delayed removal of LDL from the blood. The FH homozygotes have much higher LDL-cholesterol levels than the FH heterozygotes. FDB clinically resembles the heterozygous FH. FDB is caused by mutations in the LDL receptor–binding domain of apoB-100. Because of this mutation, LDL binds the LDL receptor with reduced affinity and LDL is removed from the blood at a reduced rate.
C) incorrect
D) incorrect

Case 14 (Raynaud's Phenomenon)

A 30 year old woman is concerned about her fingers which sometimes get white and numb for no apparent reason and after a short time they are bright red. In the beginning, it was only the fingertips, but now all fingers are included.

Question 14.1
The picture shows the patient's hands. What do you see?

Answers 14.1
A) Acrocyanosis
B) Peripheral artery disease
C) Acute arterial occlusion
D) Raynaud's phenomenon

Solution 14.1
A) incorrect
B) incorrect
C) incorrect
D) correct: Raynaud's phenomenon is characterized by possibly painful episodic ischemia of the fingers which lasts 30 minutes at most. There are three phases during an attack: first, pallor as a reaction to vasospasms of the digital arteries, then cyanosis results because of paralysis of the venules and last, rubor appears through reactive vasodilatation and increased blood flow.

Question 14.2
For which disease is Raynaud's phenomenon typical?

Answers 14.2
A) Dermatomyositis
B) Scleroderma
C) Lupus erythematosus
D) Henoch-Schönlein Purpura

Solution 14.2
A) incorrect
B) correct: Raynaud's phenomenon is separated into the idiopathic form and the secondary form which is caused through various underlying illnesses such as scleroderma, thrombangiitis obliterans or Waldenstöm's disease. The idiopathic form is triggered by cold or emotional stress.
C) incorrect
D) incorrect

Case 15 (Non-small Cell Lung Cancer)

A 65 year old man presents himself with abnormally formed fingers and nails. He has had a chronic cough for several years now and complains about chest pain.

Question 15.1
The picture shows the patient's fingers. What is your most likely diagnosis?

Answers 15.1

A) Mucoviscidosis

B) Sarcoidosis

C) Non-small cell lung cancer

D) Heart defect

Solution 15.1

A) incorrect

B) incorrect

C) correct: You see watch-glass nails and clubbed fingers which are signs for any lung disease and also for various heart diseases. In combination with the patient's symptoms (chronic cough and chest pain), lung cancer is most likely, especially if the patient is a lifelong smoker.

D) incorrect

Question 15.2
Which diagnostics would you initiate?

Answers 15.2

A) Bronchoscopy

B) PET-CT

C) Lung function testing

D) Chest X-ray

Solution 15.2

A) incorrect

B) incorrect

C) incorrect

D) correct: First, you would order a standard chest x-ray. Bronchoscopy is used for making the required histological diagnosis of a patient with suspected lung cancer. PET-CT is used to stage patients with confirmed lung cancer. Finally, lung function testing is done before a possible operation.

Case 16 (Erythema Nodosum)

A 25 year old woman complains about painful lesions on both her lower legs. She has been feeling a slight fatigue lately, but felt fine otherwise. She doesn't recall being bitten or stung by an insect.

Question 16.1
The picture shows the patient's lower leg. What do you see?

Answers 16.1
A) Erysipelas
B) Erythema nodosum
C) Erythema migrans
D) Erythema exsudativum multiforme

Solution 16.1
A) incorrect
B) correct: Erythema nodosum lesions are red, symmetrical and often painful subcutaneous nodules, preferably localized on the anterior surface of the lower legs. Treatment depends on the etiology, but there is always a full recovery. Women are affected more.
C) incorrect
D) incorrect

Question 16.2
What is not a possible etiology of erythema nodosum?

Answers 16.2
A) Crohn's disease
B) Sarcoidosis
C) Streptococcal infections
D) Staphylococcal infections

Solution 16.2
A) incorrect
B) incorrect
C) incorrect
D) correct: Erythema nodosum can be an accessory symptom of diseases such as Crohn's disease, ulcerative colitis or sarcoidosis. It can also be seen in case of viral or bacterial infections with streptococci, yersinia or mycobacteria. Another possible cause are drugs such as penicillin or sulfonamides. In 25% the reason remains unknown.

Case 17 (Gout)

A 65 year old man presents himself with a reddened and swollen joint of the first toe. He says the swelling started at night with sudden dramatic pain. The joint is warm and tender now.

Question 17.1
The picture shows the patient's foot. What is the most likely diagnosis?

Answers 17.1
A) Rheumatoid arthritis
B) CPPD deposition disease
C) Infectious arthritis
D) Gout

Solution 17.1
A) incorrect
B) incorrect
C) incorrect
D) correct: Gout most often affects the middle-aged to elderly men and postmenopausal women. In wealthy countries, about 20 % of the men have hyperuricemia, which results from a high blood pool of urate. The most common clinical manifestation is an acute arthritis with the metatarsophalangeal joint of the first toe typically being affected. The tarsal joints, ankles and knees or the thumb basal joint can also be involved. An acute gouty arthritis can be triggered by a dietary excess, excessive ethanol ingestion, stress or trauma.

Question 17.2
What is a complication of chronic hyperuricemia?

Answers 17.2
A) Cholelithiasis
B) Hepatopathy
C) Nephrolithiasis
D) Encephalopathy

Solution 17.2
A) incorrect
B) incorrect
C) correct: As uric acid is excreted renally, nephrolithiasis or even a nephropathy can result from chronic gout. It's rarely seen today, if the hyperuricemia is treated consequently. Other possible manifestations of chronic gout are periarticular tophaceous deposits.
D) incorrect

Case 18 (Rheumatoid Arthritis)

A 50 year old woman shows you her swollen finger joints. She tells you they are stiff in the morning and that the stiffness eases with physical activity. When you shake her hand, she expresses pain.

Question 18.1
The picture shows the patient's hand. What is your diagnosis?

Answers 18.1
A) Rheumatoid arthritis
B) Osteoarthritis
C) Vasculitis
D) Systemic lupus erythematosus

Solution 18.1
A) correct: Rheumatoid arthritis is a chronic inflammatory disease of unknown etiology, affecting the joints, tendons and bursae. It is characterized by symmetrical, peripheral polyarthritis, which typically starts in the small joints of the hands and feet. The wrist, metacarpophalangeal (MCP) and proximal interphalangeal (PIP) are the most frequently involved joints. The distal interphalangeal (DIP) joint is more commonly involved with osteoarthritis.
B) incorrect
C) incorrect
D) incorrect

Question 18.2
What is not a possible medication for the treatment of rheumatoid arthritis?

Answers 18.2
A) Infliximab
B) Methotrexate
C) Ceftriaxone
D) Prednisone

Solution 18.2
A) incorrect
B) incorrect
C) correct: Ceftriaxone is an antibiotic and not used for the treatment of rheumatoid arthritis. The medication used as treatment are divided into different categories, involving non-steroidal anti-inflammatory drugs (NSAID), glucocorticoids (such as prednisone), conventional disease-modifying anti-rheumatic drugs (DMARD, e.g. methotrexate) and biologic DMARDs (such as infliximab). With rheumatoid arthritis, it is important to treat early and aggressively to prevent joint damage and disability.
D) incorrect

Case 19 (Diabetes Mellitus)

A 70 year old woman has had type 2 diabetes mellitus for several years. She only appears irregularly for medical examination.

Question 19.1
The picture shows the patient's feet. What is the gangrene a result of?

Answers 19.1

A) Polyneuropathy

B) Macroangiopathy

C) Infection

D) Hypothermia

Solution 19.1

A) incorrect

B) correct: The gangrene is a result of the macroangiopathy which leads to peripheral arterial disease. Often the macroangiopathy is combined with a peripheral sensory neuropathy which leads to a sensitivity disorder and reduced feeling of pain. This bears the risk of not noticing a trauma or an infection. Also, poor wound healing and autonomic neuropathy promote the development of necrosis. Diabetes mellitus is the leading cause of non-traumatic amputations of the lower extremities in most developed countries. It is therefore important to regularly examine the feet of patients with diabetes mellitus.

C) incorrect

D) incorrect

Question 19.2
Which value leads to the diagnosis of diabetes?

Answers 19.2

A) Fasting plasma glucose > 7.0 mmol/l

B) HbA1c > 5.0%

C) Fasting plasma glucose > 5.6 mmol/l

D) 2h plasma glucose after OGTT > 7.8 mmol/l

Solution 19.2

A) correct: A fasting plasma glucose level < 5.6 mmol/l is normal and a fasting plasma glucose > 7.0 mmol/l leads to a diagnosis of diabetes. Also, a 2h plasma glucose after OGTT > 11.1 mmol/l and a HBA1c > 6.5% lead to a diagnosis of diabetes.

B) incorrect

C) incorrect

D) incorrect

Case 20 (CREST Syndrome)

A 60 year old woman has been diagnosed with a disease several years ago. She has been suffering from Raynaud's phenomenon for a long time and now she has noticed some skin changes now.

Question 20.1
The picture shows the patient's finger. What disease is this manifestation a complication of?

Answers 20.1
A) Sjögren's syndrome
B) Systemic sclerosis
C) Dermatomyositis
D) Lupus erythematosus

Solution 20.1
A) incorrect
B) correct: This manifestation occurs because of calcium deposits in the skin and soft tissues. It is called calcinosis cutis and is most common in patients with the limited cutaneous form of systemic sclerosis.
C) incorrect
D) incorrect

Question 20.2
Calcinosis cutis often appears in combination with other manifestations, it is then called CREST syndrome. What is not part of CREST syndrome?

Answers 20.2
A) Raynaud's phenomenon
B) Sclerodactyly
C) Esophageal dysmotility
D) Thrombocytic purpura

Solution 20.2
A) incorrect
B) incorrect
C) incorrect
D) correct: The 'T' stands for teleangiectasia.

Case 21 (Systemic Sclerosis)

A 50 year old woman has been in treatment for her disease for about 15 years. Her symptoms involve arthralgia and myalgia.

Question 21.1
The picture shows the patient's mouth. What does the patient most likely suffer from?

Answers 21.1

A) Systemic sclerosis

B) Dermatomyositis

C) Lupus erythematosus

D) Morphaea

Solution 21.1

A) correct: Systemic sclerosis is a connective tissue disorder of unknown etiology that affects about 5 times more women than men. It is characterized by fibrosis of the skin and the involvement of multiple internal organs, most commonly the gastrointestinal tract, lungs, heart and kidneys. The disease normally starts with skin alterations, starting in the fingers and continuing from distal to proximal extremities, the face and the trunk. There are three phases: an inflammatory edematous phase, an induration phase and an atrophic phase. This can lead to reduced oral aperture (microstomia), as seen in the picture. The skin alterations are often accompanied by arthralgia and myalgia.

B) incorrect

C) incorrect

D) incorrect

Question 21.2
What is not a severe complication of systemic sclerosis?

Answers 21.2

A) Pulmonal arterial hypertension (PAH)

B) Renal crisis

C) Interstitial lung disease (ILD)

D) Early dementia

Solution 21.2

A) incorrect

B) incorrect

C) incorrect

D) correct: Almost all patients have a pulmonary involvement, which is also the leading death cause. PAH and ILD are the two typical diseases. Renal crisis only appears in about 10-20% of all patients, but is also a leading death cause. Patients present with accelerated hypertension and progressive renal insufficiency. The gastrointestinal tract is affected in 80-90% of all patients, making them suffer from gastrointestinal reflux and malabsorption due to decreased intestinal motility. Cardiac involvement is possible, with PAH and renal involvement having an additional impact.

Case 22 (Onychomycosis)

A 55 year old man comes to show you his toenails. He has noticed that they have gotten thicker and whiter as usual. He has no associated skin lesions.

Question 22.1
The picture shows the patient's toenails. What is the most likely diagnosis?

Answers 22.1
A) Onychomycosis
B) Psoriasis
C) Candidiasis
D) Pseudomonas aeruginosa

Solution 22.1
A) correct: Onychomycosis, also called tinea unguium, is mostly caused by dermatophytes such as Trichophyton rubrum. They occur worldwide and infections are quite frequent. Infections with yeast fungi such as candida are also possible, but less common. Onychomycosis affects toenails more often than fingernails and is most common in patients who also have tinea pedis. The toenails are thickened and change color. There are usually no other symptoms. It is important to exclude psoriasis which usually shows associated skin lesions.
B) incorrect
C) incorrect
D) incorrect

Question 22.2
What is your next step?

Answers 22.2
A) Watchful waiting
B) Systemic therapy
C) Topical therapy
D) Confirmation of fungal infection

Solution 22.2
A) incorrect
B) incorrect
C) incorrect
D) correct: First, you have to make a culture. It is important to confirm a fungal infection, because often there is only nail deformity and because the treatment of onychomycosis is difficult. It often asks for oral antifungal therapy because it doesn't respond to topical therapy. Oral antifungal therapy can have adverse effects, interferes with other drugs and is also costly.

Case 23 (Urticaria)

A 35 year old patient comes to you with a rash that he's had since last night. It is spreading and the itching has become unbearable. He has returned from a holiday abroad a day before. This is the first time he has something like this.

Question 23.1
The picture shows the patient's trunk. What is your diagnosis?

Answers 23.1
A) Contact dermatitis
B) Urticaria
C) Psoriasis
D) Atopic dermatitis

Solution 23.1
A) incorrect
B) correct: The sudden appearance of multiple wheals is characteristic for urticaria. There is significant pruritus. Urticaria is normally self-limiting. There are various triggers for urticaria. It can be immunologically triggered and IgE-dependent as a reaction to a specific antigen such as pollen, food or drugs. An there are also non-immunologically triggered physical urticaria forms, as a reaction to cold, warmth or pressure.
C) incorrect
D) incorrect

Question 23.2
What is the first approach of treatment for acute urticaria?

Answers 23.2
A) Identification and elimination of the etiologic factor, H2 antagonist
B) Identification and elimination of the etiologic factor, topical glucocorticoids
C) Identification and elimination of the etiologic factor, Montelukast
D) Identification and elimination of the etiologic factor, H1 antagonist

Solution 23.2
A) incorrect
B) incorrect
C) incorrect
D) correct: An H2 antagonist can be added if H1 antihistamines are insufficient, but H1 antihistamines are the first approach. Another option is an $CysLT_1$ receptor antagonist such as Montelukast. Topical glucocorticoids haven't proven to be helpful.

Case 24 (Herpes Zoster)

A 37 year old patient presents himself with a unilateral rash and severe pain. The rash is not itchy. The patient is HIV positive.

Question 24.1
The picture shows the patient's back. What is your diagnosis?

Answers 24.1
A) Herpes zoster
B) Chickenpox
C) Dermatitis herpatiformis
D) Disseminated HSV infection

Solution 24.1
A) correct: The picture shows a unilateral dermatomal rash, very typical for herpes zoster. Often there is severe pain associated. Herpes zoster is sporadic, but more common in patients with immunodeficiency such as HIV.
B) incorrect
C) incorrect
D) incorrect

Question 24.2
What is not a possible complication of herpes zoster?

Answers 24.2
A) Blindness
B) Neuralgia
C) Hypo- or hyperesthesia
D) Movement disorder

Solution 24.2
A) incorrect
B) incorrect
C) incorrect
D) correct: Post herpetic neuralgia is a common complication which can last months to years and be very agonizing. Either hypo- or hyperesthesia can also result, but movement disorders don't. If the first branch of the trigeminal nerve is involved, zoster ophthalmicus can result, which can lead to blindness in absence of antiviral therapy.

Case 25 (Marfan Syndrome)

A 17 year old patient is sent to you by his parents. They are concerned about his height and want to know if he is going to continue to grow.

Question 25.1
The picture shows the patient's habitus. The father of the patient shows a very similar habitus, the mother is rather short. What is a diagnosis you most importantly have to rule out?

Answers 25.1

A) Ehlers Danlos syndrome

B) Marfan syndrome

C) Acromegaly

D) Constitutional macrosomia

Solution 25.1

A) incorrect

B) correct: Marfan syndrome is inherited autosomal dominantly or appears sporadically because of a new mutation. The mutation of the FBN1 gene leads to a abnormal fibrillin protein that cannot function properly. Very typical in patients with Marfan syndrome is a great height, thin and long extremities, disproportionately long fingers and joint laxity. Lens luxation is also common. It's important to diagnose Marfan syndrome because the mutation also affects the aorta and can lead to aortic dissection or rupture as a complication of an aortic aneurysm.

C) incorrect

D) incorrect

Case 26 (Acromegaly)

A 45 year old patient comes to see you because he has noticed that his shoes don't fit him anymore because his feet seem to have grown. He's also disturbed about constantly sweating heavily. He wants to know if there could be a reason for these changes.

Question 26.1
The picture shows the patient's hand (the left one in the picture) in comparison with another man's hand. What is the most likely diagnosis?

Answers 26.1

A) Hyperthyroidism

B) Obesity

C) Acromegaly

D) Cushing's syndrome

Solution 26.1

A) incorrect

B) incorrect

C) correct: Growth hormone hypersecretion is the reason for acromegaly. It is most commonly caused by a GH-secreting adenoma in the anterior pituitary. The manifestations are indolent and often it is clinically diagnosed after 10 years or more. Signs include increased hand and foot size, mandibular enlargement with prognathism and widened space between the front teeth. Also, hyperhidrosis, a deep and hollow-sounding voice and proximal muscle weakness and fatigue can occur. General visceromegaly results.

D) incorrect

Question 26.2
What is the preferred primary treatment for a GH-secreting adenoma?

Answers 26.2

A) Surgical removement

B) Medication

C) Irradiation

D) Watchful waiting

Solution 26.2

A) correct: Surgical resection is the initial treatment for most GH-secreting adenoma patients. Somatostatin (the natural inhibiting hormone of GH) analogues are used as adjuvant medical treatment for immediate treatment, shrinkage of large invasive tumors or to achieve control if surgery fails or is declined. Irradiation is only used when patients don't tolerate or respond to adjuvant medical treatment. There is a high rate of late hypopituitarism.

B) incorrect

C) incorrect

D) incorrect

Case 27 (Cimino Shunt)

A 58 year old patient is brought into the emergency. She was found in a somnolent state and wouldn't response adequately to questions. In the emergency unit, she suddenly starts seizuring.

Question 27.1
The picture shows the patient's arm. What is the reason for her seizure?

Answers 27.1

A) Drug intoxication

B) Renal disease

C) Diabetes

D) Tumorous growth

Solution 27.1

A) incorrect

B) correct: The patient must have some sort of renal disease because she has a Cimino shunt which is used for hemodialysis. Her symptoms are those of neurological disturbances caused by uremia, specifically called uremic encephalopathy. It starts with drowsiness and can lead up to coma.

C) incorrect

D) incorrect

Question 27.2
Which laboratory parameter wouldn't you expect?

Answers 27.2
A) Decreased bicarbonate
B) Hyperkalemia
C) Increased urea
D) Increased hemoglobin

Solution 27.2
A) incorrect
B) incorrect
C) incorrect
D) correct: With chronic kidney disease, erythropoietin production is impaired, so hemoglobin is decreased, leading to renal anemia. Regulation of potassium is disturbed: it's less secreted, therefore its level rises. In renal failure, a metabolic acidosis can occur, bicarbonate would be decreased. Retention of products obligatory excreted by urine (such as urea) results.

Case 28 (Syphilis II)

A 28 year old HIV positive man presents himself with some malaise and generalized indolent lymphadenopathy.

Question 28.1
The picture shows the patient's soles. What is the most likely diagnosis?

Answers 28.1
A) Gonorrhea
B) Chlamydia
C) Candida
D) Syphilis

Solution 28.1
A) incorrect
B) incorrect
C) incorrect
D) correct: The secondary stage of syphilis can include various mucocutaneous changes. Maculopapular, nonpruritic lesions are found on the trunk and papules on the palms or soles are very typical. Also, alopecia and oral mucosal erosions can be seen. Constitutional symptoms such as malaise, sore throat or fever are possible and a generalized indolent lymphadenopathy is typically found. The number of cases of syphilis has been increasing since 2000. Most cases affect men who have sex with men, many of whom are co-infected with HIV.

Question 28.2
What is the drug of choice for all stages of syphilis?

Answers 28.2

A) Azithromycin

B) Penicillin G

C) Doxycycline

D) Ceftriaxone

Solution 28.2

A) incorrect

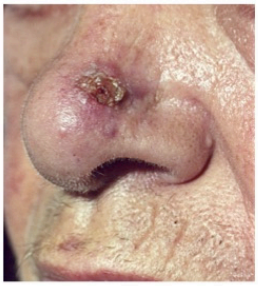
B) correct: Penicillin G benzathine is the most widely used agent; a single dose of 2.4 million units is recommended for early syphilis. In case of a penicillin allergy, a 2-week course therapy with doxycycline or tetracycline is recommended. Patients should be warned about the Jarisch-Herxheimer reaction which occurs in about 50% of the syphilis cases treated with penicillin. Symptoms start after 6-8 h and include fever, chills, headache and tachycardia. Symptom-based therapy is sufficient for this mild transient reaction.

C) incorrect

D) incorrect

Case 29 (Basal Cell Carcinoma)

A 70 year old woman comes to show you a lesion on her nose.



Question 29.1
The picture shows the patient's nose. What do you see?

Answers 29.1

A) Squamous cell carcinoma

B) Melanoma

C) Basal cell carcinoma

D) Fibroma

Solution 29.1

A) incorrect

B) incorrect

C) correct: The basal cell carcinoma is the most common malignant tumor. It presents as a small, slowly growing pearly nodule. It grows locally destructive, but almost never metastasizes. The most significant factor for its development is cumulative sunlight exposure (principally the UV-B spectrum). People with a fair complexion who sunburn easily are most at risk. Most tumors are found on the head and neck. Squamous cell carcinomas are often found on the lip or the ears.

D) incorrect

Case 30 (Graft-versus-host-disease)

A 55 year old patient has been treated for chronic myeloid leukemia.

Question 30.1
The picture shows the patient's palms. Which cells are responsible for this reaction?

Answers 30.1

A) Donor B cells

B) Host NK cells

C) Host T cells

D) Donor T cells

Solution 30.1

A) incorrect

B) incorrect

C) incorrect

D) correct: You see a graft-versus-host disease (GVHD) after a hematopoietic cell transplantation. It can develop about 2-4 weeks after the transplant when allogeneic donor T cells react with antigenic targets on the host cells. It gets apparent with an erythematous maculopapular rash, diarrhea or liver disease with increased levels of bilirubin. The incidence of acute GVHD is higher in recipients of stem cells from mismatched or unrelated donors. To prevent GVHD, patients receive immunosuppressive drugs early after transplant.

Question 30.2
Infection is another big problem with post transplant patients. What is the threshold of neutrophilic granulocytes that initiates prophylactic antibiotic treatment?

Answers 30.2

A) 1000/µL

B) 500/µL

C) 500/ml

D) 1500/ml

Solution 30.2

A) incorrect

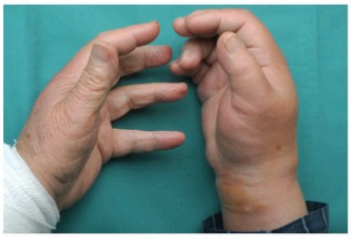
B) correct: The normal count of neutrophilic granulocytes is between 3000 to 5800 per µL. If the count falls beneath 500/µL early after the transplant, chances of getting a bacterial infection are very high.

C) incorrect

D) incorrect

Case 31 (Gonococcal Infection, disseminated)

A 55 year old woman's wrist is swollen and painful. She's never had this before. She came back from her holidays with her daughter in the Caribbean a month ago, but hasn't noticed any other sickness since then.



Question 31.1
The picture shows the woman's wrist. Which organism is likely to have caused the swelling?

Answers 31.1

A) Neisseria gonorrhoeae

B) Treponema pallidum

C) HIV

D) Salmonella enterica

Solution 31.1

A) correct: The woman has gonococcal arthritis, a reactive arthritis resulting from gonococcal bacteremia. Reactive arthritis is often asymmetric, includes one or two joints and most commonly involves the knees, wrists, ankles or elbows. It follows either a bacterial urethritis or a bacterial enteritis, after a latency of about 2-6 weeks. A urethritis is more likely to pass without the patient noticing. Gonorrhea is a sexually transmitted infection and normally manifests as cervicitis, urethritis, proctitis or conjunctivitis.

B) incorrect

C) incorrect

D) incorrect

Question 31.2
What is the empirical medication for gonorrhea?

Answers 31.2

A) Penicillin

B) Ceftriaxone plus azithromycin

C) Ceftriaxone

D) Metronidazole

Solution 31.2

A) incorrect

B) correct: A single dose of ceftriaxone is the first-line treatment of gonorrhea. Because co-infection with chlamydia occurs frequently, a single dose of azithromycin is standardly given as well.

C) incorrect

D) incorrect

Case 32 (Erysipela)

A 40 year old woman comes to show you her leg. It's very sensitive to pressure, bit doesn't itch. She also has a fever.

Question 32.1
The picture shows the patient's leg. What is your diagnosis?

Answers 32.1

A) Allergic contact dermatitis

B) Erysipela

C) Phlebothrombosis

D) Erythema migrans

Solution 32.1

A) incorrect

B) correct: Erysipelas are characterized by an abrupt onset of fiery-red swelling of the face or extremities. Erysipelas have a well-defined margin, are hyperthermic and very sensitive to pressure. Patients with erysipelas suddenly feel sick and develop fever. Complications may involve thrombosis and glomerulonephritis. Treatment with penicillin is effective.

C) incorrect

D) incorrect

Question 32.2
Which bacteria most commonly causes erysipelas?

Answers 32.2

A) Staphylococcus epidermidis

B) Staphylococcus aureus

C) Streptococcus agalactiae

D) Streptococcus pyogenes

Solution 33.2

A) incorrect

B) incorrect

C) incorrect

D) correct: Erysipelas are most commonly caused by Streptococcus pyogenes, a β-hemolytic group A streptococcus. They are found as normal colonization on our skin. If there is some sort of trauma to the skin, an infection may occur. Another pathogen which can cause erysipelas is Staphylococcus aureus.

Case 33 (Crohn's Disease)

A 25 year old patient presents himself with crampy abdominal pain located in the right lower quadrant and diarrhea. He has had a series of this episodes in the past.

Question 33.1
The picture shows the patients tongue. What is your next step?

Answers 33.1
A) Colonoscopy
B) Gastroscopy
C) CT of the abdomen
D) Consult an ear, nose and throat specialist

Solution 33.1
A) correct: To rule out Crohn's disease, you would order a colonoscopy and biopsy. Extra intestinal symptoms are more frequent in Crohn's disease than ulcerative colitis. They can involve the skin (e.g. enoral aphthas, pyoderma gangraenosum), the eyes (e.g. conjunctivitis, uveitis), the joints (e.g. arthritis) or the liver (primary sclerosing cholangitis).
B) incorrect
C) incorrect
D) incorrect

Case 34 (Leishmaniasis Cutis)

A 10 year old girl is brought in by her mother because of a lesion behind her ear. The family has been on holiday in Peru 2 months ago. She believes that her daughter was stung by an insect at the site of the lesion.

Question 34.1
The picture shows the lesion behind the girl's ear. What sort of organism is most likely to have caused it?

Answers 34.1
A) Fungus
B) Virus
C) Bacteria
D) Protozoa

Solution 34.1
A) incorrect
B) incorrect
C) incorrect
D) correct: The lesion is caused by a species of leishmania, a protozoa. Different leishmania cause different syndromes: visceral, cutaneous and mucosal leishmaniasis. They are transmitted by sandflies which occur in tropical and temperate regions. There are about 2 million cases a year worldwide. In case of cutaneous leishmaniasis, the lesion starts out as a purple papule (weeks to months after the sting), which continues to grow and then ulcerates centrally. Most lesions heal spontaneously after 9 to 15 months.

Question 34.2
Leishmania affects the patient's reticuloendothelial system. Which organ is rather not involved?

Answers 34.2
A) Kidney
B) Spleen
C) Bone marrow
D) Lymph node

Solution 34.2
A) correct: The reticuloendothelial system involves the spleen, the liver, the lymph nodes and the bone marrow.
B) incorrect
C) incorrect
D) incorrect

Case 35 (Pyoderma Gangraenosum)

A 60 year old patient has had severe ulcerative colitis since many years.

Question 35.1
The picture shows the patient's legs. What do you see?

Answers 35.1
A) Erythema nodosum
B) Necrobiosis lipoidica
C) Acrodermatitis chronica atrophicans
D) Pyoderma gangraenosum

Solution 35.1
A) incorrect
B) incorrect
C) incorrect
D) correct: Pyoderma gangraenosum is a extra intestinal manifestation of inflammatory bowel disease, more common with ulcerative colitis than Crohn's colitis. It is usually associated with severe disease. The lesions are commonly found on the dorsal surface of the feet and legs, but may also occur on other parts of the body. Pyoderma gangraenosum starts out as a pustule, then spreads and ulcerates. There is a margin of erythema with violaceous edges and a center which contains necrotic tissue, blood and exudates. Pyoderma gangraenosum can be very difficult to treat.

Question 35.2
What is the first-line medicinal treatment of ulcerative colitis?

Answers 35.2
A) Mesalazin
B) Corticosteroid
C) Azathioprine
D) Infliximab

Solution 35.2
A) correct: Mesalazin or another 5-aminosalicylare is recommended as first-line medicinal treatment. If it is insufficient, corticosteroids are used topically or systemically for a short time. For immunosuppression, Azathioprine is used. Infliximab is a TNF-blocker which can also be used in severe cases.
B) incorrect
C) incorrect
D) incorrect

Case 36 (Angioedema)

A 65 year old man presents himself as shown in the picture. He complains about pruritus, but no pain.

Question 36.1
The picture shows the patient's tongue. What is this clinical picture called?

Answers 36.1
A) Anasarca
B) Myxedema
C) Erysipela
D) Angioedema

Solution 36.1
A) incorrect
B) incorrect
C) incorrect
D) correct: An angioedema (also called Quincke's edema) is a sudden, painless swelling of the subcutis or submucosa. It can appear anywhere on the body and can be dangerous if the upper respiratory tract is involved, leading to laryngeal obstruction. There are various causes for an angioedema, for example it can be immunologically triggered or appear as a reaction to a physical stimulus such as heat or cold. There is also a hereditary form. Angioedemas are normally self-limiting in duration after the triggering agent has been identified and eliminated. An antihistamine is the drug of choice. For more serious cases, systemic glucocorticoids are used.

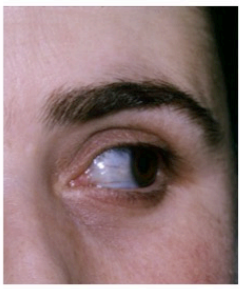
Question 36.2
Which drug is known for causing angioedemas?

Answers 36.2
A) Captopril
B) Diphenhydramine
C) Cimetidine
D) Propranolol

Solution 36.2
A) correct: ACE inhibitors such as captopril are known for causing angioedemas as side effect. Angioedemas are not a side effect of beta blockers (propranolol). Diphenhydramine and cimetidine are antihistamines, used as drug therapy against angioedemas.
B) incorrect
C) incorrect
D) incorrect

Case 37 (Osteogenesis Imperfecta)

A 40 year old woman comes in for her annual check-up. She has a history of fractures and hearing loss.



Question 37.1
The picture shows the woman's sclerae. What is her diagnosis?

Answers 37.1

A) Vitamin D deficiency

B) Osteogenesis imperfecta

C) Ehlers-Danlos syndrome

D) Otosclerosis

Solution 37.1

A) incorrect

B) correct: The woman has type 1 osteogenesis imperfecta (OI). It is inherited autosomal dominantly and the bone fragility is mild. Blue sclerae and hearing loss are present in most patients. OI is caused by different mutations in the the COL1A1 and COL1A2 genes which provide information for type 1 procollagen. Type 1 collagen is essential for the synthesis of bone matrix. The mutations lead to a decrease in bone mass, making the bone brittle.

C) incorrect

D) incorrect

Case 38 (Stevens-Johnson Syndrome)

A 48 year old woman comes to the ER with severe fever and in general bad condition. She has some blisters and epidermal detachment and is in pain. You find out that she has been treated with cotrimoxazol because of an urinary tract infection. Also, her eyes have been burning and she has had a sore throat.

Question 38.1
The picture shows the patient's mouth. What is your diagnosis?

Answers 38.1

A) Pemphigus foeliaceus

B) Fixed drug eruption

C) Hypersensitivity syndrome

D) Stevens-Johnson syndrome

Solution 38.1

A) incorrect

B) incorrect

C) incorrect

D) correct: Stevens-Johnson syndrome (SJS) or toxic epidermal necrosis (TEN) normally break out within 4 weeks after starting a new medication and are characterized by blisters and epidermal detachment. Prodromes are fever, burning eyes and a sore throat. The syndrome starts out with painful, grey, maculopapular lesions which tend to coalesce quickly. Then blisters and epidermal detachment develop. Mucosal involvement is present in over 90% of the cases. SJS is the term used when less then 10-30% of the skin is affected and TEN is used when over 30% of the skin is affected. Drugs that most commonly cause SJS or TEN are sulfonamides, allopurinol, anticonvulsants or anti-HIV medications.

Question 38.2
What is not established as possible treatment for SJS and TEN?

Answers 38.2
A) Immediate discontinuation of any suspected drug
B) Early diagnosis
C) Supportive therapy
D) Long-term systemic glucocorticoid therapy

Solution 38.2
A) incorrect
B) incorrect
C) incorrect
D) correct: Unfortunately, at this time there is no treatment with proven efficacy for SJS and TEN. The actions above produced the best results so far. There are studies on-going on the possible use of glucocorticoids and intravenous immunoglobulin.

Case 39 (Graves' Disease)

A 70 year old man tells you he's been feeling overly nervous and irritable. Also, he has problems sleeping and concentrating. He says sometimes his heart goes at a very fast rate.

Question 39.1
The picture shows the patient's face from the side. What is most likely causing the sign you see?

Answers 39.1
A) Graves' disease
B) Retro bulbar tumor
C) Thyroiditis
D) Addison's disease

Solution 39.1
A) correct: You see an endocrine ophthalmology with proptosis of the eyeball. This ophthalmology normally starts with lid retraction or lag, then a periorbital edema appears and next, proptosis occurs. In severe cases, proptosis can lead to corneal exposure and subsequent damage. Also, the extra-ocular muscles can swell and cause diplopia. The most serious manifestation is compression of the optic nerve, leading to papilledema and eventually sight loss. In 90% of the cases, endocrine ophthalmology happens in the presence of Graves' disease. This autoimmune disorder is caused by an auto-antibody which mimics TSH to the TSH receptor, leading to increased secretion of thyroid hormones and therefore hyperthyroidism.
B) incorrect
C) incorrect
D) incorrect

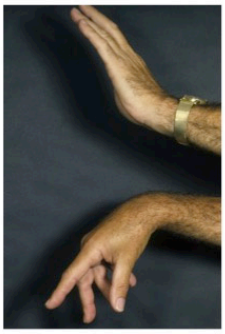
Question 39.2
What is not a symptom or sign of Graves's disease?

Answers 39.2
A) Cold intolerance
B) Tremor
C) Diarrhea
D) Oligomenorrhea

Solution 39.2
A) correct: With hyperthyreosis, patients feel heat intolerance and are sweating more.
B) incorrect
C) incorrect
D) incorrect

Case 40 (Radialis Paralysis)

A 48 year old patient presents with a paralysis in one of his distal upper extremities.



Question 40.1
The picture shows the patient's hands as he holds them up. Which nerve is unilaterally paralyzed on the right side?

Answers 40.1
A) Median nerve
B) Radial nerve
C) Ulnar nerve
D) Axillar nerve

Solution 40.1
A) incorrect
B) correct: The patient shows failure to extend the wrist and the fingers. The resulting position is called wristdrop and appears because the tonus of the intact flection muscles outbalances the tonus of the paralyzed extension muscles. Other signs of radialis paralysis are thumb abduction weakness and sensory loss between the thumb and the index finger.
C) incorrect
D) incorrect

Question 40.2
What is not a possible cause for radialis paralysis?

Answers 40.2
A) Humerus fracture
B) Long narcosis
C) Elbow luxation
D) Use of crutches

Solution 40.2
A) incorrect
B) incorrect
C) correct: The other three named are the most common causes for radialis paralysis. An elbow luxation or fracture more likely leads to an ulnar paralysis.
D) incorrect

Case 41 (Friedreich's Ataxia)

A 20 year old man with a known disorder comes in for a routine check. He has a staggering gait and the neurologic examination reveals an ataxia, an absence of deep tendon reflexes and loss of vibratory and proprioceptive sensation. Also, he has a dysarthria.

Question 41.1
The picture shows the patient's foot. Its shape is very typical for the disorder. Knowing the patient's symptoms, what is the disorder called?

Answers 41.1
A) Multiple sclerosis
B) Charcot-Marie-Tooth disease
C) Friedreich's ataxia
D) Parkinson's disease

Solution 41.1
A) incorrect
B) incorrect
C) correct: You see a pes cavus or a pes excavatus, a high-arched foot. It is very typical for Friedreich's ataxia, sometimes even called Friedreich's foot. A high-arched foot can also be congenital or a result of paralysis or nerve damage. It can also be a first sign of a muscular weakness or disorder, such as the Charcot-Marie-Tooth disease. Friedreich's ataxia is the most common form of inherited ataxia, usually presenting before the age of 25 years with a staggering gait, frequent falling and titubation. The lower extremities are more severely involved than the upper ones.
D) incorrect

Question 41.2
What is normally life-limiting for patients with Friedreich's ataxia?

Answers 41.2

A) Cardiac involvement

B) Muscular weakness

C) Diabetes mellitus

D) Dementia

Solution 41.2

A) correct: Diabetes mellitus and dementia can occur in patients with Friedreich's ataxia, but cardiac involvement is usually the life-limiting factor. It consists of a hypertrophic cardiomyopathy involving myocytic hypertrophy and fibrosis, leading to cardiac arrhythmia. Unfortunately, there is very limited treatment for Friedreich's ataxia and the median age of death in patients is 35 years.

B) incorrect

C) incorrect

D) incorrect

Case 42 (Tuberous Sclerosis)

A 50 year old man comes to your practice because of a sprained ankle.
When you examine his foot, you notice something.

Question 42.1
The picture shows the patient's toe. What disorder does the patient have?

Answers 42.1

A) Fabry Disease

B) Neurofibromatosis

C) Tuberous sclerosis

D) Fungal infection

Solution 42.1

A) incorrect

B) incorrect

C) correct: Tuberous sclerosis (TSC) is an autosomal dominant disorder with a frequency of about 1 in 5000 to 10'000. The mutation occurs either in the TSC1 gene which encodes the protein hamartin or the TSC2 gene which encodes the protein tuberin. Hamartin and tuberin build a complex which is involved in various signaling pathways. Patients with TSC typically have hypopigmented macules and facial and periungual angiofibromas.

D) incorrect

Question 42.2
Which of the following organs is the least commonly involved with TSC?

Answers 42.2
A) Kidney
B) Heart
C) Liver
D) Brain

Solution 42.2
A) incorrect
B) incorrect
C) correct: Patients with TSC have an increased risk of developing subependymal nodules, cortical tubers and subependymal giant cell astrocytomas. As a consequence, they frequently require anticonvulsants for seizures. Patients with TSC can also have renal angiomylipomas and cardiac rhabdomyomas. The renal angiomyolipomas often stay unnoticed by the patient, but need to be observed because of possible malignant transformation. The cardiac rhabdomyomas normally reach their biggest size at birth and then start to degenerate, not causing any problems.
D) incorrect

Case 43 (Ehlers-Danlos Syndrome)

A 16 year old patient is in your practice for a routine check-up. As you examine him, you are surprised by something.

Question 43.1
The picture shows the mobility of the patient's joints. What is his disorder?

Answers 43.1
A) Ehlers-Danlos syndrome
B) Marfan syndrome
C) Paget's disease
D) Cutis laxa

Solution 43.1
A) correct: Ehlers-Danlos syndrome (EDS) is a disorder of the connective tissue characterized by hyperelasticity of the skin and hypermobility of the joints. There are several types of this inherited disease and overall, it occurs in about 1 in 5000 births.
B) incorrect
C) incorrect
D) incorrect

Question 43.2
What is not a possible complication of the various types of EDS?

Answers 43.2

A) Rupture of internal organs

B) Heart valve insufficiency

C) Hernias

D) Aortic aneurysms

Solution 43.2

A) incorrect

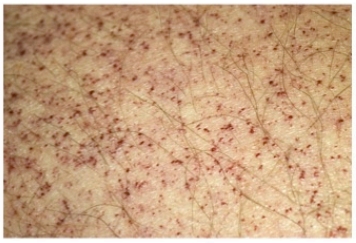
B) incorrect

C) incorrect

D) correct: The fragility of the tissue can lead to rupture of internal organs, such as big arteries, uterus and intestine. Mitral valve prolapse can lead to heart insufficiency and hernias can occur. Aortic aneurysms are typically seen in patients with Marfan syndrome, not EDS.

Case 44 (Fabry Disease)

A 15 year old patient shows up in your practice for a check-up. You notice multiple lesions on his skin. He says he's had them for as long as he can remember and that they don't bother him. You ask him if he's had any other symptoms or signs. He says sometimes his fingers or toes suddenly start to feel tingly and numb.



Question 44.1
The picture shows the patient's thigh up close. What is the most likely diagnosis?

Answers 44.1

A) Recklinghausen's disease

B) Meningitis

C) Fabry disease

D) Henoch-Schönlein Purpura

Solution 44.1

A) incorrect

B) incorrect

C) correct: Fabry disease is an X-linked disorder with a mutation that leads to a deficiency of α-galactosidase A. A defect in the glycosphingolipid metabolism results, leading to a lysosomal storage disorder. What you can see in the picture are the very typical angiokeratomas: small, dark red to blue-black, flat or slightly raised spots which do not blanch when pressure is applied. They are very typically found in the area around the umbilicus and from there on downwards to the knees.

D) incorrect

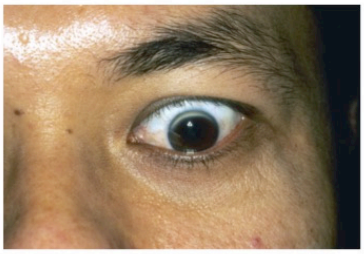
Question 44.2
How big is the risk of passing the disorder on to a son, if the mother is a carrier of the disease and the father is healthy?

Answers 44.2
A) 25%
B) 50%
C) 0%
D) 100%

Solution 44.2
A) incorrect
B) correct: The children of a woman carrying the mutated gene have a 50% chance of inheriting it – independent of there sex. However, if a son has inherited the mutated gene, he will definitely have the disorder. A daughter is only going to be another carrier.
C) incorrect
D) incorrect

Case 45 (Arcus Lipoides)

A patient you haven't seen before comes in for the flu vaccination. As you set up, you notice something in his eyes.



Question 45.1
The picture shows one of the patient's eyes. Which parameter is probably elevated in his blood?

Answers 45.1
A) Cholesterol
B) Copper
C) CRP
D) Triglycerides

Solution 45.1
A) correct: You see an arcus lipoides which is formed when fat accumulates in the cornea. It is typically seen in older patients with age- and diet-related hypercholesterolemia. If you see it in younger patients, you have to think of a lipoprotein metabolism disorder such as the familial hypercholesterolemia.
B) incorrect
C) incorrect
D) incorrect

Question 45.2
Which protein is defect in familial hypercholesterolemia?

Answers 45.2

A) Hepatic lipase

B) LDL receptor

C) HDL receptor

D) Lipoprotein lipase

Solution 45.2

A) incorrect

B) correct: Familial hypercholesterolemia (FH) is an autosomal dominant disorder caused by a mutation in the LDL receptor gene. LDL cholesterol normally circulates in the body for 2.5 days and then binds to the LDL receptor on the liver cells, triggering endocytosis. In case of FH, LDL receptor function is reduced or absent, and LDL circulates for an average duration of 4.5 days, resulting in significantly increased level of LDL cholesterol in the blood with normal levels of other lipoproteins. FH is characterized by tendon xanthomas, arcus lipoides and premature coronary atherosclerosis. FH patients should be aggressively treated to lower plasma levels of LDL cholesterol because of the high risk of having a myocardial infarction at an early age.

C) incorrect

D) incorrect

Case 46 (Kaposi's Sarcoma)

A 35 year old woman shows you several lesions on the inside of her upper arm. She doesn't complain about pain or itchiness. Otherwise, she feels fine and she doesn't have any fever. The woman has a history of intravenous drug abuse.

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Question 46.1
The picture shows the patient's arm. Which origin do these lesions have?

Answers 46.1

A) Neoplastic

B) Congenital

C) Allergic

D) Traumatic

Solution 46.1

A) correct: What you see is Kaposi's sarcoma. It's an AIDS-defining condition in patients with HIV. Kaposi's sarcoma is a multicentric neoplasm consisting of multiple vascular nodules which can appear in every part of the body, most commonly on the skin. The colors of the lesions range from reddish to purple to brown and often take the appearance of a bruise. They can only be a few millimeters big or several centimeters and they can be apart or confluent. Kaposi's sarcoma can be seen at any stage of HIV. Patients normally don't die from Kaposi's sarcoma, therefore it's only treated under two main circumstances: either if the lesions cause significant discomfort or cosmetic problems or if the lesions interfere with breathing or swallowing if they're located in the oropharyngeal area.

B) incorrect

C) incorrect

D) incorrect

Question 46.2
What is not an AIDS-defining condition?

Answers 46.2

A) Toxoplasmosis of the brain

B) Wasting syndrome

C) Listeriosis

D) Non-Hodgkin's lymphoma

Solution 46.2

A) incorrect

B) incorrect

C) correct: Listeriosis is not an AIDS-defining condition. AIDS-defining conditions are the wasting syndrome, HIV-associated encephalopathy, certain opportunistic infections (e.g. toxoplasmosis of the brain, pneumocystis jiroveci pneumonia, atypical mycobacteriosis, cytomegalovirus disease) and certain malignant tumors (Kaposi's sarcoma, non-Hodgkin's lymphoma, cervical cancer). Other illnesses which are not AIDS-defining: fever < 38.5°C, chronic diarrhea, candidiasis of the oropharyngeal or vulvovaginal area and herpes zoster.

D) incorrect

Case 47 (Nevus Flammeus)

During the examination of a new patient, you notice something on one of his arms. The 30 year old man says he's had this as long as he can remember.

Question 47.1
The picture shows the patient's arm. What do you see?

Answers 47.1

A) Hemangioma

B) Nevus flammeus

C) Hematoma

D) Purpura

Solution 47.1

A) incorrect

B) correct: A nevus flammeus (also called port-wine stain) almost always exists from the point of birth. It can be anywhere on the body. A nevus flammeus is caused by a capillary vascular anomaly and normally persists throughout life, it can even get darker over time. Unfortunately, there is no satisfying treatment for a nevus flammeus. Lasertherapy can be tried. It is important to rule out eye involvement if the nevus is around the eye, as it may cause a glaucoma. The differential diagnosis of a nevus flammeus is a hemangioma, a benign tumor of the blood vessels. A hemangioma usually appears in the first weeks of life and then continues to grow over the first six months. Around twelve months, involution starts, and at the age of ten, the majority have disappeared.

C) incorrect

D) incorrect

Question 47.2
What is the newest treatment of choice for hemangiomas?

Answers 47.2

A) Surgical removal

B) Beta blockers

C) Corticosteroids

D) Aspirin

Solution 47.2

A) incorrect

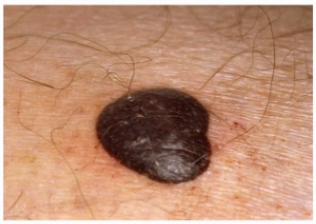
B) correct: The effectiveness of beta blockers on the disappearance of hemangiomas was only recently discovered by chance, when a child with a severe heart defect was treated with propranolol and its hemangioma started disappearing.

C) incorrect

D) incorrect

Case 48 (Warfarin Skin Necrosis)

A 64 year old man with a metabolic syndrome is being treated for a deep vein thrombosis in his right lower leg. First, he was treated with heparin, then with a coumarin. On the fifth day, he complains of strong pain from several erythematous macular lesions on his trunk. A few hours later, the lesions appear hemorrhagic and the pain is overwhelming.



Question 48.1
The picture shows one of the lesions on the patient's trunk. Which drug caused the lesion?

Answers 48.1

A) Statin

B) Heparin

C) Coumarin

D) Beta blocker

Solution 48.1

A) incorrect

B) incorrect

C) correct: A rare adverse event when treating with coumarins is skin necrosis. It can appear three to five days after the treatment was started, but also several months later. It most commonly occurs in overweight, middle-aged women. The cause is still not known. Warfarin-induced necrosis is associated with deficiency of protein C, which regulates and limits clotting. Warfarin decreases protein C synthesis, leading to a temporary hypercoagulability in patients with protein C deficiency. Surgical debridement of the already occurred necrosis is necessary and progression of the necrosis is stopped by discontinuing warfarin therapy.

D) incorrect

Question 48.2
What is the mechanism of coumarins?

Answers 48.2

A) Activation of the body's own antithrombin

B) Direct thrombin inhibition

C) Vitamin K antagonism

D) Prothrombin inhibition

Solution 48.2

A) incorrect

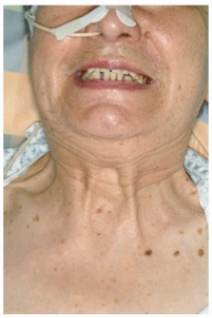
B) incorrect

C) correct: Coumarins are vitamin K antagonists. They decrease the synthesis of the vitamin K-dependent clotting proteins and the proteins C and S. Heparins work through activation of the body's own antithrombin and there are various direct thrombin inhibitors.

D) incorrect

Case 49 (Risus Sardonicus)

A 48 year old woman presents herself in the emergency room with a lockjaw, general muscle pain and stiffness and difficulty swallowing. You learn that she fell off her bike three days ago and sustained multiple open wounds on her arms and legs.



Question 49.1
The woman's condition quickly worsens. What illness is she suffering from?

Answers 49.1

A) Rabies

B) Diphtheria

C) Botulism

D) Tetanus

Solution 49.1

A) incorrect

B) incorrect

C) incorrect

D) correct: The woman is suffering from tetanus. What you see in the picture is called a risus sardonicus, caused by spasms of the mimic musculature. The spasms start in the muscles of face and jaw and develop into a generalized muscle spasm. Commonly, the laryngeal muscles are involved, which can lead to respiratory failure. Therefore, it's important to secure the airways in severe tetanus. Tetanus is caused by a neurotoxin produced by the bacterium Clostridium tetani and is completely preventable by vaccination. Once established, tetanus has a very high mortality rate.

Question 49.2
How often should a tetanus booster vaccination occur in adulthood?

Answers 49.2
A) Every 10 years
B) Every 5 years
C) Every 15 years
D) Every second year

Solution 49.2
A) correct
B) incorrect
C) incorrect
D) incorrect

Case 50 (Henoch-Schönlein Purpura)

A 16 year old patient presents herself with polyarthralgia and abdominal pain with nausea, vomiting and melena.

Question 50.1
The picture shows the patient's lower leg. She has a similar lesion on the other leg. What does she most likely suffer from?

Answers 50.1
A) Idiopathic thrombocytopenic purpura
B) Behçet's disease
C) Henoch-Schönlein purpura
D) Microscopic polyangiitis

Solution 50.1
A) incorrect
B) incorrect
C) correct: In combination with the patient's symptoms the purpura on both her lower legs are indicative for Henoch-Schönlein purpura, a small-vessel vasculitis which is immune complex mediated. Palpable purpura is seen in almost all patients. Most of them develop polyarthralgia, gastrointestinal symptoms occur in about 70% and renal involvement occurs in 10-50%. Children are more commonly affected. The treatment is symptomatic and most patients recover fully.
D) incorrect

Question 50.2
What is not typical for the purpura in Henoch-Schönlein purpura?

Answers 50.2
A) It's palpable.
B) It's symmetrical.
C) It's blanchable.
D) It's on the legs and buttocks.

Solution 50.2
A) incorrect
B) incorrect
C) correct: The purpura are palpable, non-blanchable and spread symmetrically on the legs and buttocks.
D) incorrect

5. Resultate

5.1. Test

Mit dem Online Testing ClassMarker wurde ein Test generiert, um die Medienarbeit zu erproben und ein Feedback einzuholen. Es wurden 97 Fragen zu den Bildern und 5 Feedbackfragen gestellt.

Abbildung 1. Beispiel Frage 1

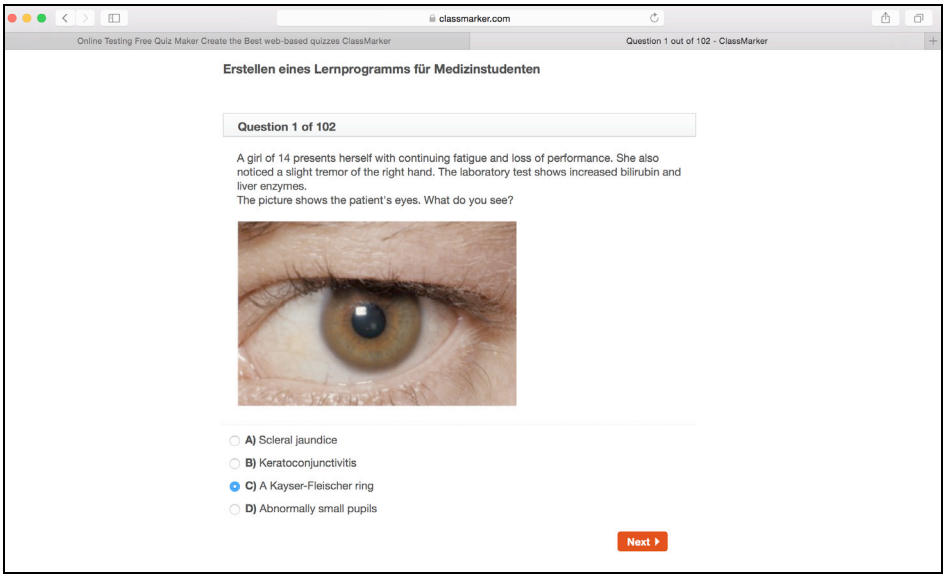


Abbildung 2. Beispiel Feedback bei korrekter Antwort

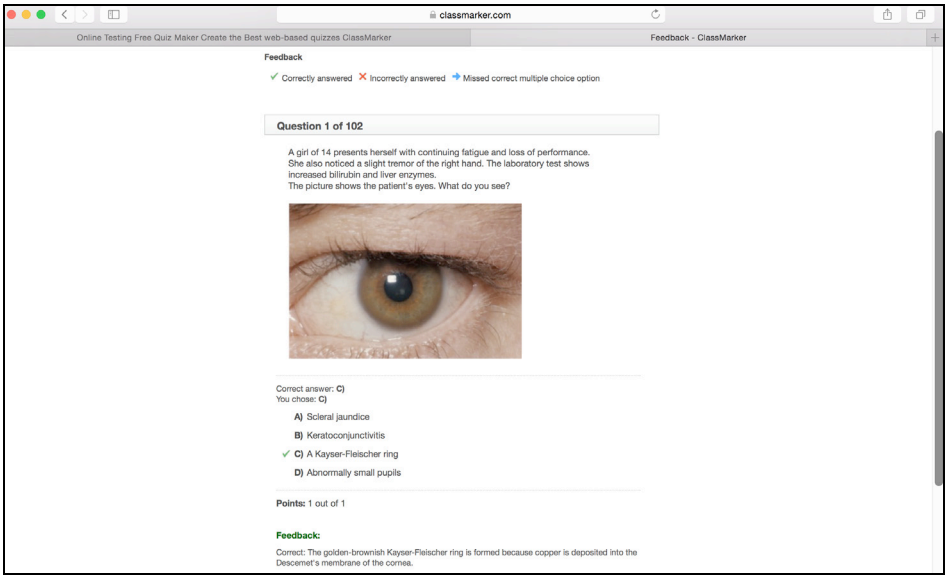


Abbildung 3. Beispiel Frage 2

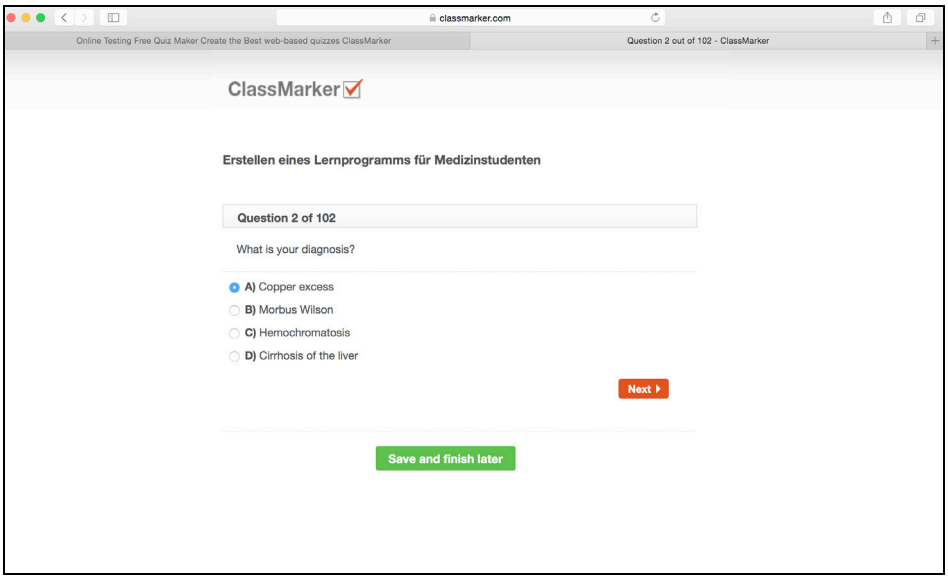
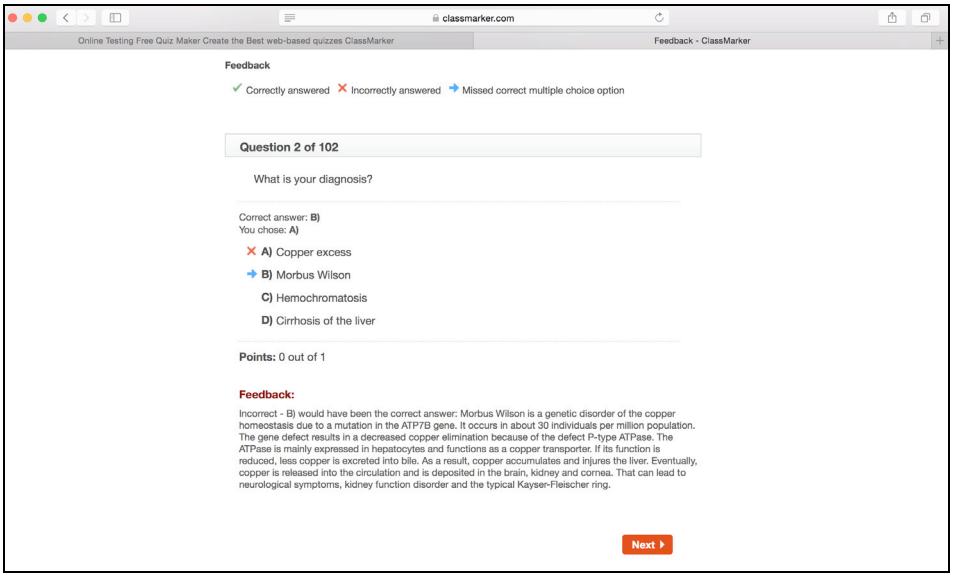


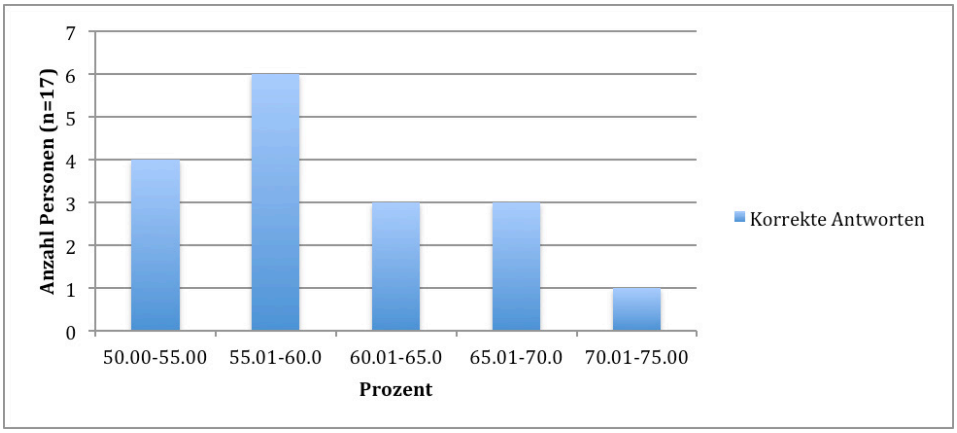
Abbildung 4. Beispiel Feedback bei inkorrekter Antwort



5.2. Ergebnis

Am Test nahmen 17 Personen teil. Im Mittel wurden 59.34% der 97 Fragen richtig beantwortet (Diagramm 1). Das höchste erzielte Resultat war 71.78% und das tiefste 50.44%.

Diagramm 1. Prozentsatz korrekter Antworten



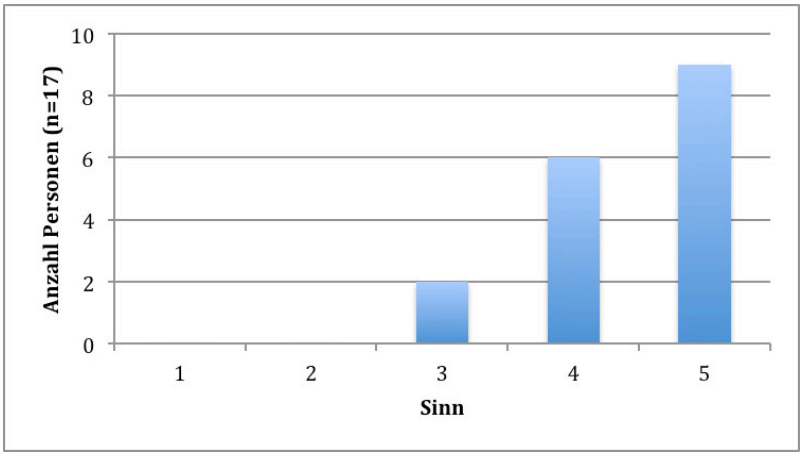
5.3. Feedback

Es wurden fünf Fragen gestellt, um die Qualität und den Nutzen der Medienarbeit zu erfassen.

5.3.1. Sinn

Neun Personen bewerteten den Sinn eines Lernprogramms in diesem Format auf einer Skala von 1-5 (wobei 1=nicht sinnvoll, 5=sehr sinnvoll) mit 5, sechs Personen mit 4 und zwei Personen mit 3 (Diagramm 2).

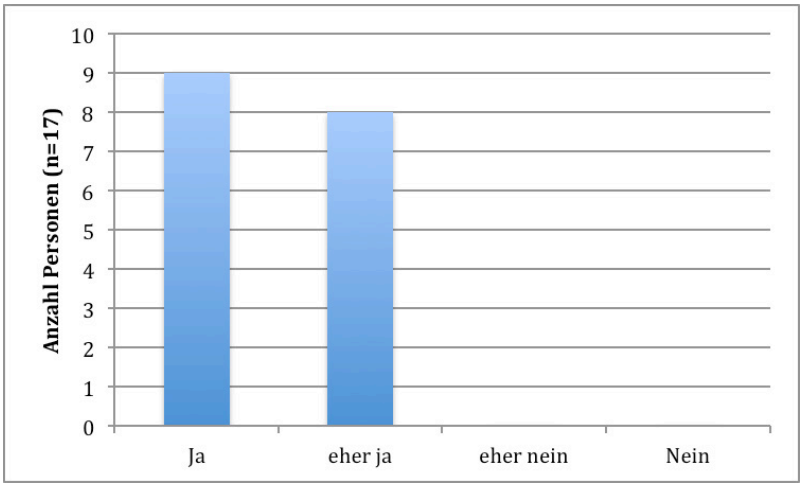
Diagramm 2. Wie sinnvoll findest Du ein Lernprogramm wie dieses auf einer Skala von 1-5?



5.3.2. Benutzung

Neun Personen würden ein Lernprogramm in diesem Stil benutzen und acht Personen würden es eher benutzen als nicht (Diagramm 3).

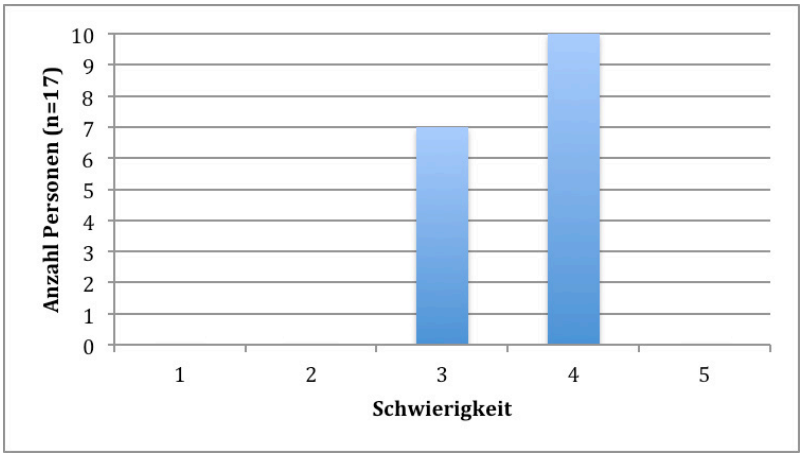
Diagramm 3. Würdest Du ein erweitertes Lernprogramm in diesem Stil benutzen?



5.3.3. Schwierigkeit

Zehn Personen bewerteten die Schwierigkeit der Fragen auf einer Skala von 1-5 (wobei 1=sehr einfach, 5=sehr schwierig) mit 4 und sieben Personen mit 3 (Diagramm 4).

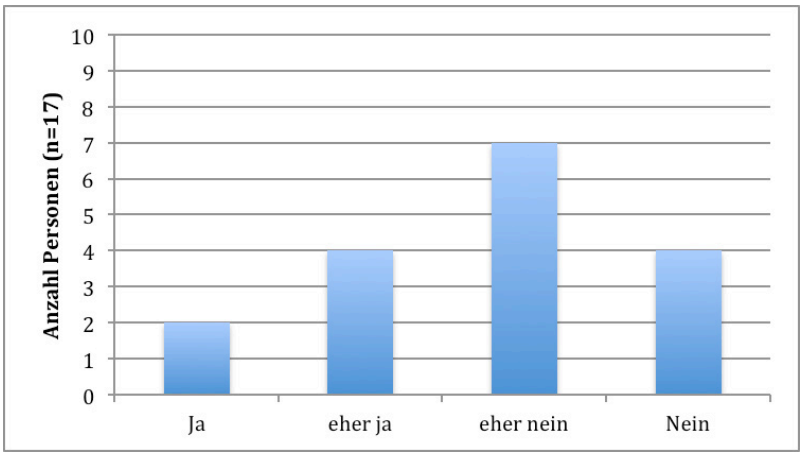
Diagramm 4. Wie schwierig fandest Du die Fragen auf einer Skala von 1-5?



5.3.4. Erschwert durch Fremdsprache

Zwei Personen empfanden das Beantworten der Fragen erschwert durch die Fremdsprache und 4 Personen empfanden es eher erschwert. Vier Personen verneinten ein Erschweren durch die Fremdsprache und sieben Personen fanden es eher nicht erschwert (Diagramm 5).

Diagramm 5. Waren die Fragen erschwert durch die Fremdsprache?



5.3.5. Verbesserungsvorschläge und Kommentare

Fünf Personen äusserten Kritik an der Bildqualität, deren Verbesserung die Beantwortung der Fragen erleichtert hätte. Zwei davon schlugen eine Zoom-Möglichkeit vor. Insbesondere das Bild zu den blauen Skleren wurde zweimal als unklar beschrieben.

Jemand empfand die Lösungstexte als zu lang, wenn in den Folgefragen davon ausgegangen wird, dass sie gelesen werden müssen. Eine andere Person hob die Lösungstexte jedoch als auf den Punkt gebracht positiv hervor.

Eine Person wünschte sich das Lernprogramm auf Deutsch und eine andere Person schrieb, dass sie von einigen der vorgekommenen Krankheiten den englischen Begriff nicht kannte.

Zudem wurde vorgeschlagen, einige Fragen mit „am ehesten zutreffend“ zu formulieren und es sollten weniger negativ gestellte Fragen vorkommen oder diese sollten deutlicher markiert werden.

Drei Personen beschrieben das Lernprogramm als sehr gut. Eine Person empfand die Fragen im positiven Sinne anspruchsvoll und eine Person beschrieb die Themendurchmischung als positiv. Zwei Personen lobten die Folgefragen.

Schlussendlich beschrieb jemand, dass einige Fragen sehr schwierig waren und andere sehr einfach. Eine andere Person fand, es wäre einfacher, das Programm mittels Tastatur zu steuern anstatt mit der Maus.

6. Diskussion

Generell wurde die Medienarbeit sehr positiv aufgenommen. Die Mehrheit empfand das Lernprogramm als sinnvoll und würde es benutzen. Die Umfrage beschränkte sich jedoch auf 17 Personen. Eine umfassendere Analyse könnte sicherlich noch genauere Resultate hervorbringen.

Die Schwierigkeit der Fragen ist vielleicht etwas zu hoch, was sich sowohl in der subjektiven Empfindung als auch im Durchschnitt der richtig beantworteten Fragen zeigt (Diagramm 4, 1). Da die App aber einen Lerneffekt erzielen sollte, interpretiere ich den Schwierigkeitsgrad als richtig.

Die Meinungen bezüglich der Fremdsprache gehen auseinander, hier wäre zu überlegen, ob das Programm wirklich in Englisch geführt werden sollte, wenn es nur an Studenten der Universität Zürich gerichtet ist, welche doch nahezu alle Deutsch sprechen. Vielleicht könnte ansonsten in einer überarbeiteten Version die Möglichkeit eingebaut werden, gewisse Begriffe ins Deutsche zu übersetzen.

Bei der Entwicklung der App sollte darauf geachtet werden, dass eine hohe Bildqualität verwendet und - falls technisch - möglich ein Zoomen ermöglicht wird. Es muss an dieser Stelle erwähnt werden, dass beim Online Testing ClassMarker nur eine eingeschränkte Speichergrösse hochladbar war, worunter die Qualität der Bilder gelitten hat. Im Original sind die Bilder von sehr hoher Qualität.

Auch sollte bei der App im Text die Möglichkeit bestehen, gewisse Wörter hervorzuheben, sodass negativ gestellte Fragen klarer erkennbar sind.

7. Literaturverzeichnis

Für das Lernprogramm wurden die folgenden Quellen als Hilfsmittel verwendet:

- Fauci, A.S., Hauser, S.L., Jameson, J.L., Kasper, D.L., Longo, D.L., Loscalzo, J. (2012). *Harrison's™ PRINCIPLES OF INTERNAL MEDICINE.* (18th eds.). United States of America: The McGraw-Hill Companies, Inc.

- UpToDate®. http://www.uptodate.com/de/home (7. November 2015).

Für den Online Test wurde die folgende Website benutzt:

- ClassMarker. https://www.classmarker.com (26. Oktober 2015).

8. Lebenslauf

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9. Erklärung

Masterarbeit

Ich erkläre ausdrücklich, dass es sich bei der von mir im Rahmen des Studiengangs

Humanmedizin

eingereichten schriftlichen Arbeit mit dem Titel

Erstellen eines Lernprogrammes für Medizinstudenten und Assistenzärzte

um eine von mir selbst und ohne unerlaubte Beihilfe sowie *in eigenen Worten* verfasste Masterarbeit* handelt.

Ich bestätige überdies, dass die Arbeit als Ganzes oder in Teilen weder bereits einmal zur Abgeltung anderer Studienleistungen an der Universität Zürich oder an einer anderen Universität oder Ausbildungseinrichtung eingereicht worden ist.

Verwendung von Quellen

Ich erkläre ausdrücklich, dass ich *sämtliche* in der oben genannten Arbeit enthaltenen Bezüge auf fremde Quellen (einschliesslich Tabellen, Grafiken u. Ä.) als solche kenntlich gemacht habe. Insbesondere bestätige ich, dass ich *ausnahmslos* und nach bestem Wissen sowohl bei wörtlich übernommenen Aussagen (Zitaten) als auch bei in eigenen Worten wiedergegebenen Aussagen anderer Autorinnen oder Autoren (Paraphrasen) die Urheberschaft angegeben habe.

Sanktionen

Ich nehme zur Kenntnis, dass Arbeiten, welche die Grundsätze der Selbstständigkeitserklärung verletzen – insbesondere solche, die Zitate oder Paraphrasen ohne Herkunftsangaben enthalten –, als Plagiat betrachtet werden und die entsprechenden rechtlichen und disziplinarischen Konsequenzen nach sich ziehen können (gemäss §§ 7ff der Disziplinarordnung der Universität Zürich sowie §§ 51ff der Rahmenverordnung für das Studium in den Bachelor- und Master-Studiengängen an der Medizinischen Fakultät der Universität Zürich

Ich bestätige mit meiner Unterschrift die Richtigkeit dieser Angaben.

Datum: 17. Februar 2016

Name: Truttmann Vorname: Rahel

Unterschrift:

* Falls die Masterarbeit eine Publikation enthält, bei der ich Erst- oder Koautor/-in bin, wird meine eigene Arbeitsleistung im Begleittext detailliert und strukturiert beschrieben.